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material having an inner surface electrically conductively connected to the outer surface on the indium tin oxide coating.

It is respectfully requested that the rejection of the Office Action be reconsidered and withdrawn in view of the amendments and arguments submitted in this response.

Rejection under 35 U.S.C. § 103(a)

On page 2 of the Office Action, Claims 1-8 have been rejected under 35 U.S.C. §103(a) as being unpatentable "over US Pat No. 5,635,720 issued to Mooney et al and US Pat No. 3,887,827 issued to Katayama and in further view of US Pat No. 4,891,522 issued to Coon et al."

However, in view of the manner in which these references are specifically applied in combination, as set forth in paragraphs 10 and 13, it is assumed that Katayama was intended to be applied as a secondary reference rather than a second primary reference thereby making Coon et al a tertiary reference.

Claim 1, as amended above, more clearly distinguishes from the primary reference Mooney et al by reciting, inter alia,

(a) an electrically conductive retaining ring having opposite ends and a non-oxidizing exterior around said wall of said substrate;

(b) a radially inwardly extending lip on one end of said ring overlying in spaced relation said outer edge portion of said outer surface on said indium tin oxide coating and forming a central opening in said one end of said ring;

(c) an electrically conductive adhesive means between and connecting said overlying lip and said outer edge portion of said indium tin oxide coating;

(d) a scintillator material having an inner surface electrically conductively connected to said outer surface on said indium tin oxide coating and extending through said central opening in said one end of said ring; and

(e) an outer surface on said scintillator material opposite to said inner surface thereof.

Therefore, this claim distinguishes from the primary reference not only as acknowledged in paragraph 8 of the detailed action, but in addition by the "non-oxidizing exterior around said wall of said substrate" of limitation (a) above, limitation (e) above, and also by limitations (c) and (d) defining the

detailed structure of the lip of the retaining ring having a specific central opening through which the scintillator material extends. With regard to limitation (e), the examiner's attention is respectfully invited to the light absorbtive layer 36 of Mooney et al which is required to improve the ultimate resolution of the light image produced by the scintillator of Mooney et al, as described in col. 1, line 64-col.2 line 9, and col.4, lines 19-34. Accordingly, Mooney et al do not teach or suggest that the scintillator of the patent could function in the manner and carry out the purpose thereof as described in the patent without the additional component of the layer 36. Thus, there is no intention in this reference of omitting the light absorbtive layer 36 thereby providing an outer surface on the scintillator material as recited in Claim 1 (and as shown at 40 in Figs. 3,4 and 6 of the application), when considered as a whole, since layer 36 is clearly intended to provide an outer surface over the scintillator, which is an entirely different structure than the instant invention. Accordingly, this reference teaches away from applicant's invention which obviates the need for any outer coating on the outer surface of the scitillator material.

Furthermore, due to applicant's unique lip structure on the ring member having a central opening the adhesive means is particularly located between the lip 22 and the specifically recited outer edge portion 34 of the outer surface 38 of the instant invention, whereas the adhesive layer 44 of the reference extends over the entire upper surface of layer 40 (as shown in Fig.2).

In addition, Mooney et al teach collecting the Primary electron beam by the scintillator and therefore have to deal with charges built up to the voltage of the primary beam, as distinguished from the instant invention which is intended for collecting only secondary electrons having a low voltage of 1-50 ev. Accordingly, the scintillator of the application does not require an optional coating such as shown at 38 of the reference.

In paragraphs 9 and 10 of the detailed action of the rejection, the secondary reference Katayama is applied as teaching a "retaining ring (22) having a radially inwardly extending lip on one end of said ring", arguing that it would have been obvious to combine the teachings of these two references "since Katayama teaches improved fabrication to protect from mechanical and thermal shock during fabrication". However, Katayama relates to a different field of art of either the instant invention or Mooney et al. Katayama relates to

a means for preventing damage to a target substrate of a an image pick-up tube target assembly while manufacturing and using the target assembly and for attaching it within a pick-up tube. There is no mention of or reference to a scintillator of an electron microscope or even a remote suggestion that the subject of this patent could be useful in a scintillator. Furthermore, applicant's scintillator is not concerned with mechanical or thermal shock during manufacture or use.

The instant invention is a new and unique scintillator for an electron microscope for use particularly in collecting low voltage secondary electrons where the collector has a positive bias that accelerates the low energy secondary electrons toward the detector. Therefore, the scintillator of this invention has a retaining ring of electrically conducting material having a non-oxidizing exterior surface around the side wall of the substrate and a specific lip structure. Applicant conceived through years of research and development the novel interrelated structural features, and combination thereof, of substrate, indium tin oxide (hereinafter ITO) coating on the substrate, scintillator material on the ITO coating, and retaining ring recited in Claim 1, to produce a scintillator which overcomes existing problems in this art and

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provides a distinct improvement over known scintillators and produces unexpected results by providing better electrical contact, lower signal to noise ratio, reduces pinhole interference, obviates the need for an aluminum coating, and makes it easier to handle during installation. Thus, this invention has filled a long felt need in this art by providing a scintillator which is different in structure and function from known scintillators, which differences when taken as a whole would not have been obvious at the time they were made to a person having ordinary skill in this art.

Neither the specific structural features as claimed, nor the novel combination thereof, are taught or suggested in the references. For example, neither Mooney et al nor Katayama make reference to a retaining ring, or such a ring of electrically conducting material, and having a non-oxidizing exterior surface , to enhance use for collecting low energy secondary electrons, as discussed above. Katayama is concerned only with ring 22 providing robust construction that provides means for obviating exposure of a target substrate to mechanical and thermal shock during fabrication and use (col.1, lines10-19;col. 2, lines 9-19; col.3, lines 20-24). Furthermore, there is no suggestion in either reference or the rejection why or how these references could be

combined to produce an operable scintillator having the specific structural and improved functional features recited in Claim 1. Accordingly, any suggestion for combining the references could only have come from a knowledge of applicant's disclosure. The rejection, therefor, is based on using applicant's teachings against him, which is an improper basis for a rejection on obviousness.

It is well established that in order to establish obviousness, (1) there must be some suggestion or motivation in the prior art to modify the reference(s) or to combine teachings thereof, (2) there must be a reasonable expectation of success, (3) the prior art must teach or suggest all the claim limitations, and (4) the teaching or suggestion to make the combination claimed and reasonable expectation of success must be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991). See MPEP Sec. 2143-Sec. 2143.03. It is submitted that none of these criterion are not met in this rejection.

Further evidence of non-obviousness is that the lip part of the retaining ring is to make electrical contact with the ITO under the phosphor scintillator. The specific lip is also for preventing the retaining ring from compromising the

phosphor coating when it is attached. Without the gold ring of the invention, the ring would have to pierce the phosphor coating to make contact with the ITO coating. However, mechanical contact with the thin coating of the ITO is not sufficient for conductivity. Applicant's specific ring with lip eliminates this problem and results in greatly improved performance of the scintillator. It is clear that the references either do not have this problem, or never recognized it and therefore could not possibly teach a solution thereto. Katayama is neither in the field of applicant's endeavor nor reasonably pertinent to the particular problem with which the invention is concerned. *In re Oetiker*, 977 F.2d 1443,1446, 24 USPQ2d 1443. See MPEP Sec. 2141.01(a). It follows that a person having ordinary skill in this art would never conceive of attempting to combine the references as alleged in the rejection because the differences are such that it would not be obvious to do so.

Moreover, the secondary reference was issued in 1975 and the primary reference was filed about 20 years later in 1995. It is submitted that if Mooney et al had thought that Katayama's patented features were in any way related to their scintillator, and could be incorporated or combined therewith for any useful purpose, they would have done so. This is further evidence that a

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combination of these references as proposed by the rejection clearly would not have been obvious.

In paragraphs 11,12 and 13 of the detailed action, the rejection further acknowledges that neither of the first two references teaches an electrically conductive adhesive means and then applies a third reference, Coon et al, as showing such means in a particle detector. However, applicant is not claiming an electrically conductive adhesive per se as the invention, but rather as a part of a new combination of elements in a different arrangement which produces new and unusual results in scintillators for electron microscopes. Simply because Coon et al show the use of such an adhesive means in a different art, which in that case is particle detectors, for securing discrete rectangular planar p-i-n diode chips to a heavy metal carrier, does not in any way make applicant's novel combination of features obvious when considered as a whole. See MPEP Sec. 2141.02.

For the above reasons, it is respectfully submitted that the rejection is based on a shopping list of references from various unrelated arts in an attempt to show different features of the invention, but with no teaching or suggestion in the references themselves, or in the rejection, either of any manner in which

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they could be combined for use in a scintillator, or of any structural or functional similarities to those different features which if combinable could produce an operable device having the advantages of the invention as claimed. Thus, the references, when combined, do not teach or suggest all the claim limitations. See MPEP Sec. 2143.

With regard to Claims 2 and 3, the rejection, in paragraph 14, admits that "neither Mooney et al nor Coon et al explicitly teach a retaining ring made of solid gold, however Katayama does teach an electrically conductive ring." It is respectfully submitted, however, that the only reference that shows a ring at all is Katayama, and that ring is for providing a means to prevent damage to the target substrate during manufacture and use, an entirely different purpose than the retaining ring of the invention, as discussed above. In addition, in the scintillator of the invention the ring must be made of a material that is also non-oxidizing, a quality not considered or discussed in any of the references. This further shows that there were many features the applicant had to consider in order to arrive at the novel construction of the invention and produce a significant advance in the scintillator art. This also further shows that even if

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it were possible to combine the teachings of all the references, the result would not produce the invention as described and claimed in the application.

With regard to the rejection of Claim 5 for the reasons set forth in paragraph 16 of the official action, it is again respectfully submitted that neither Mooney et al nor Coon et al show a ring at all, much less one made of gold. Katayama merely shows an electrically conductive ring in an unrelated art for protecting the target substrate during manufacture and use, as discussed above. It would be obviously economically impractical to make such a ring from an expensive material such as gold, when other less rare and costly materials would be more suitable to accomplish the objective desired. The specific substrate and scintillator materials are not relied upon per se for patentability, but have been recited to define the invention of Claim 1 in greater detail.

With regard to the rejections of Claims 6,7 and 8, in paragraphs 17 and 18, here again applicant is not relying for patentability on the specifically recited dimensions and shape of the scintillator per se. These have been recited to define the invention in greater detail, but nevertheless do further distinguish the invention over the references due to the different structure and function, and

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novel combination thereof, of the claimed elements from the various elements of the references thereby making the invention non-obvious in view thereof.

In paragraph 15 of the detailed action, the sole method claim 4 has been rejected as obvious over the same three references as the article claims. It has been shown above that the differences between the scintillator as claimed and the prior art are such that the subject matter as a whole would not have been obvious at the time the invention was made to a person having ordinary skill in the art to which it pertains. Therefore, this rejection is based on the erroneous premise that "the obvious combination" of said references teaches the "fabrication method" of Claim 4, since there is no "obvious combination" of references. Furthermore, Claim 4 distinguishes over the primary reference Mooney et al by reciting the steps of ,

(f) providing a retaining ring having a non-oxidizing surface, an internal size to fit in close contacting engagement with said side wall of said substrate, and a radially inwardly extending lip on one end;

(g) applying electrical conducting adhesive means on at least the radially outer edge portion of the exposed surface of said indium tin oxide coating;

(h) fitting said retaining ring onto said substrate in close contacting engagement with said side wall of said substrate and said lip overlying in close contacting engagement with said radially outer edge portion of said indium tin oxide coating having said adhesive means thereon to bond said ring to said coating and said substrate; and

(i) depositing scintillation material onto and in bonding relationship with said exposed surface of said coating.

In Mooney et al, since there is no teaching of the step of fitting a retaining ring, or any ring, around the scintillator unit, it appears that an adhesive material 44 is applied onto the entire upper surface of the layer 40 and thereafter (absent the use of optional coating 42) the scintillator material 22 is applied onto the entire upper surface of layer 44 and layer 36 is then applied onto the entire upper surface of layer 22. Due to the required sequence of steps outlined above, it is clear that there is no teaching or suggestion of step (f) of Claim 4 of the application. On the contrary, the method of this reference teaches in the opposite direction since any attempt to add a ring would entirely change the steps of the method of the reference and therefore would not be obvious to a person having skill in this art.

The instant method of Claim 4 requires that the retaining ring having the radially inwardly extending lip thereon be fitted onto the substrate and ITO coating (step (h) above) after the electrically conductive adhesive is applied to the radially outer edge portion of the exposed surface of the ITO coating to bond the ring to the coating and substrate (step(g) above) and before depositing the scintillation material so that the latter is in bonding relationship with the exposed surface of the ITO coating (step (i) above). Only this sequence of steps is capable of producing a scintillator having the high performance characteristics and other advantages and improvements of the invention over known scintllators in the prior art.

The addition of the second and third reference from other arts in this rejection in some arbitrary manner is not taught or suggested in the references themselves, but could only come from a knowledge of applicant's disclosure, which is tantamount to using applicant's teachings against him . As stated above, this is an improper basis for a rejection on obviousness.

The reference to Katayama (col. 2, lines 40-47) in paragraph 11 of the detailed action is not understood, since in the sequence of steps in applicant's process, as outlined above, the retaining ring is applied onto the substrate

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(step (h) above) after the adhesive coating (step (g) above) and before the scintillation material (step (i) above). It is submitted, therefore, that this reference is irrelevant to the unique method recited in Claim 4 when considered in its entirety, which is the only way it can be considered - a sequence of steps in combination to produce a new and unexpected result-to meet the requirements for a rejection on obviousness.

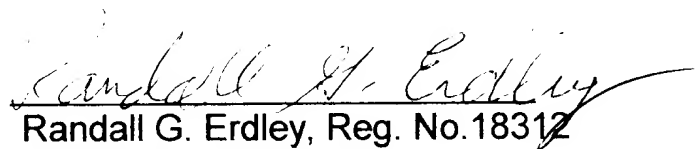
Coon et al is equally irrelevant for the reason that it merely shows the use of an electrically conductive adhesive in an unrelated art and has nothing to do with a process comprising a new series of steps for making a scintillator. It is the combination of steps in a particular order to produce a useful objective that must be considered in determining patentability of a method. A mere collection of unrelated steps from a variety of arts for no particular purpose does not make out a basis for rejecting a new and unusual method on the ground of obviousness.

It is respectfully submitted that the above arguments show that the invention of this application as claimed patentably distinguishes over the references, or any combination thereof, and produces new and unexpected results in the art of scintillators for electron microscopes. Therefore, it is

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requested that the rejection be reconsidered and withdrawn and the claims be allowed.

Respectfully submitted,

A handwritten signature in cursive script, reading "Randall G. Erdley", written over a horizontal line.

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